

Remarks

Applicants respond hereby to the outstanding Office Action mailed February 1, 2005. Each of pending claims 1-17 has been amended hereby, including the suggested amendment to claim 10 as set forth at paragraph 1 of the outstanding office action. No new matter is entered.

Response To Rejections Under 35 USC § 102

Claims 1-7, 9, 16 and 17 have been rejected under 35 USC § 102(b) as anticipated by US Patent No. 6,292,683 to Gupta et al. ("the '683 patent"). The Examiner states that the '683 patent includes that individual data sets comprise data elements that assign values to spatial positions (col. 7, lines 9-10), a local intensity variation is established from data values in successive data sets in corresponding spatial positions (col. 7, lines 10-14), localizing a region of interest from one or more successive data sets (col. 7, lines 24-27), wherein the local intensity variation in the region of interest conforms with a predetermined property.

Applicants respectfully disagree.

Applicants' independent claim 1 sets forth a method of analyzing successive data sets, where each of the individual data sets comprise data elements which assign data values to spatial positions. The method includes establishing a local intensity variation $[I(x,t)]$ from data values in successive data sets in corresponding spatial positions, and localizing a region of interest on the basis of the local intensity variation from one or more of the successive data sets, wherein the local intensity variation in the region of interest is in conformity with a predetermined property.

Applicants' independent claim 16 sets forth an analysis system for analyzing successive data sets, wherein individual data sets comprise data elements which assign data values to spatial positions. The system includes means to establish a local intensity variation $[I(x,t)]$ from data values in successive data sets in corresponding spatial positions, and means for localizing, a region of interest from one or more of the successive data sets on the basis of the local intensity variation, wherein the local intensity variation in the region of interest is in conformity with a predetermined property.

Applicants' independent claim 17 sets forth a computer-readable medium for storing a set of computer instructions, which instructions are capable of implementing a method of analyzing successive data sets, including individual data sets with data elements that assign data values to spatial positions. The instructions include establishing a local intensity variation $[I(x,t)]$ from data values in successive data sets in corresponding spatial positions, and localizing, on the basis of the local intensity variation, a region of interest from one or more of the successive data sets, wherein the local intensity variation in the region of interest being in conformity with a predetermined property.

In contrast, the '683 patent discloses a method and apparatus to track anatomical motion or medical instruments in a sequence of MR images in order to implement automatic registration between successive images. The invention includes identifying a local reference region in a region of interest in a reference image and acquired from a time series. The local reference region of the reference image is compared to that of the other MR images and a translational displacement is determined between the local reference region of the reference image and of another MR image. The translational displacement has signal intensity invariance and can accurately track anatomy motion to align the images for automatic registration. The '683 patent tracks motion in a time series of MR images by detecting and tracking linear relationships between the images and is insensitive to signal intensity variation. The '683 patent, therefore, may be said to teach away from the inherent inventive concepts represented in applicants' claims.

More particularly, while the Examiner cites col. 7, lines 9-14 and lines 24-5, to establish a prima facie case of anticipation, applicants do not agree that cited text of the '683 patent includes each of the elements of applicants' claims 1, 16 and 17. The '683 patent includes an automatic registration algorithm which determines translational displacement in a series of images without any need to utilize temporal intensity variations at corresponding spatial positions in a string of images. Applicants' inventions as claimed require that an intensity **variation** is established from one or more successive data sets, where the intensity variation conforms to a fixed property. Moreover, nowhere at lines 10 and 11 of column 7 does the text teach or even suggest the use of a local intensity variation in conformity of a predetermined property. The '683 patent merely extracts a series of patterns from an initial reference image, still less reference to correlation

coefficients.

Accordingly, applicants respectfully assert that independent claims 1, 16 and 17 are not anticipated by the '683 patent, and request withdrawal of the rejection of claims 1, 16 and 17 under 102(b) in view of same. For that matter, because claims 2-7 and 9 depend from independent claim 1, applicants respectfully assert that claims 2-7 and 9 are not anticipated under 102(b) in view of the '683 patent, and request withdrawal of the reject of claims 2-7 and 9 for at least the reasons set forth for the patentability of claim 1.

Response To Rejections Under 35 USC § 103

Claim 8 was rejected under 35 USC § 103(a) as unpatentable over the '683 patent in view of US Patent No. 5,343,390 to Doi et al. The Examiner states that the '683 patent does not teach or suggest masking data values based on spatial gradients, but that Doi discloses a method that parts with spatial gradients of data values masked in individual data sets in as far as the modulus of the spatial gradients in the relevant parts exceeds a predetermined acceptable gradient modulus (col. 8, lines 19-24).

Applicants respectfully disagree.

Applicants above argument patentably distinguishes claim 1 from the '683 patent. Hence, even assuming arguendo that there is some teaching or suggestion in either the '683 patent or the '390 patent to Doi for combining the references would still not realize applicants' inventions as set forth in claim 1, or in claim 8 which depends from claim 1. Hence, applicants claim 8 is not obvious by the combination of the '683 patent and the '390 patent, and applicants respectfully request the withdrawal of the claim 8 rejection under 103(a) by the '683 patent in view of the '390 patent.

Claims 10-12 were rejected under 35 USC 103(a) as unpatentable over the '683 patent in view of US Patent No. 5,797,396 to Geiser ("the '396 patent). The Examiner asserts that the '683 patent does not teach or suggest obtaining MIPs or obtaining a feature image from differencing MIPs, but that the '396 patent teaches MIPs determined for respective regions of interest (col. 9, lines 19-27), and a feature image formed from differences between the MIPs (col. 9, lines 40-42), and it would have been obvious to combine the two references to realize applicants claims 10-12.

Applicants respectfully disagree.

Applicants independent claim 10 sets forth a method of analyzing successive data sets. The claim 10 method includes localizing a plurality of regions of interest on the basis of a local intensity variation, wherein the local intensity variation in said regions of interest being in conformity with a predetermined property, determining maximum intensity projections (MIPs) for the respective regions of interest, and forming a feature image from differences between said maximum intensity projections.

While the Examiner states that the '683 patent teaches a plurality of regions of interest localized on a basis of local intensity variation in regions of interest in conformity with a predetermined property, applicants have stated above that the '683 patented method and system rely on intensity invariance, NOT intensity variation. Moreover, the Geiser '396 patent at col. 9, lines 19-27, does not teach or suggest MIPs determination for a region of interest. A circular arc filter does not provide for MIPs as required by applicants independent claim 10.

Hence, even assuming arguendo that there is some teaching or suggestion in the references which would suggest their combination to one skilled in the art, the combination would still not realize applicants invention as set forth in independent claim 10. Consequently, claim 10 is not obvious under 103(a) by combining the references and applicants respectfully request withdrawal of the rejection. Moreover, because claims 11 and 12 depend from claim 1, claims 11 and 12 are also non-obvious for at least the reasons set forth for the patentability of claim 10, and applicants respectfully request withdrawal of the rejection of claims 11 and 12.

Claims 13-15 were rejected under 35 USC § 103(a) by the '683 patent in view of US Patent No. 5,360,006. The Examiner asserts that the '683 patent does not teach or suggest the creation of a mask from a time derivative, but that the '006 patent discloses that a mask is derived from the time derivative of the local intensity variation for an individual data set, and the region of interest is segmented from the relevant data set by means of the mask (col. 14, lines 21-28), and that it would have been obvious to combine the two references to realize claims 13-15.

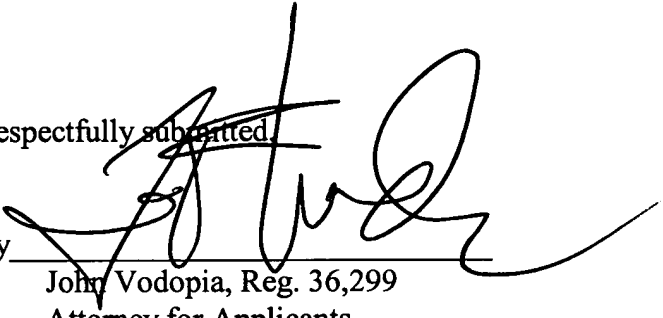
While the Examiner asserts that combining the '683 patent with the '006 patent will realize applicants claims 13-15, applicants respectfully disagree. That is, even combining the '006 patent with the '683 patent would still not realize inventions as

claimed in claims 13-15 for at least the reasons set forth above for the patentability of claims 1, 16 and 17 under 102(b) in view of the '683 patent. Hence, applicants respectfully request the withdrawal of the rejections of claim 13-15 under 103(a) in view of the '683 and '006 patents.

Allowance of claims 1-17 and passage to issue of the application is respectfully requested.

Respectfully submitted,

By



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